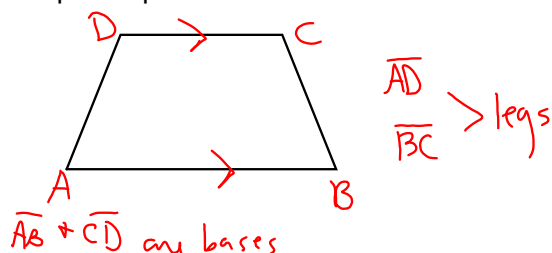
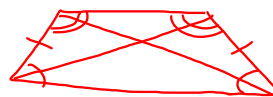


### 8-5 Use Properties of Trapezoids and Kites

trapezoid--quadrilateral with exactly one pair of parallel sides



isosceles trapezoid-- congruent legs

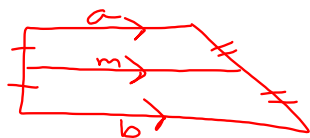


Theorem 8.14--If a trapezoid is isosceles, then each pair of base angles is congruent

Theorem 8.15--If a trapezoid has a pair of congruent base angles, then it is isosceles.

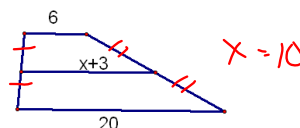
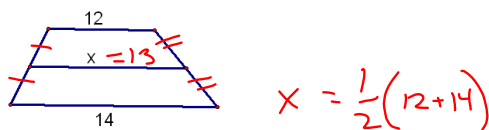
Theorem 8.16--A trapezoid is isosceles iff its diagonals are congruent

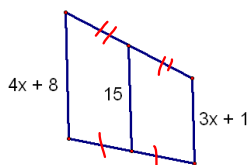
Midsegment--joins the midpoints of the legs



Theorem 8.17--The midsegment of a trapezoid is parallel to the bases and  $= \frac{1}{2}$  the sum of the lengths of the bases

$$m = \frac{1}{2}(a+b)$$





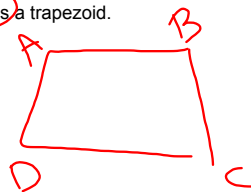
$$15 = \frac{1}{2}(4x + 8 + 3x + 1)$$

$$\frac{1}{2}(7x + 9)$$

$$3 = x$$

Verify that ABCD is a trapezoid.

A(5, 1)  
B(-3, -1)  
C(-2, 3)  
D(2, 4)

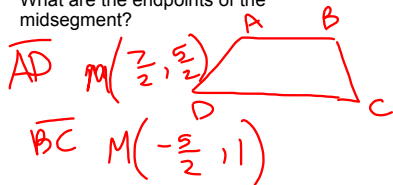


See if only one pair is  $\parallel$ .

$\overline{AB}$   $m = \frac{1}{4}$   $\overline{AD}$   $m = -1$   $> \text{not } \parallel$   
 $\overline{CD}$   $m = \frac{1}{4}$   $\overline{BC}$   $m = 4$

What are the endpoints of the midsegment?

A(5, 1)  
B(-3, -1)  
C(-2, 3)  
D(2, 4)

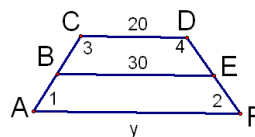


Is it isosceles?

$$AD = \sqrt{3^2 + (-3)^2} = \sqrt{18}$$

$$BC = \sqrt{(-1)^2 + (-4)^2} = \sqrt{17}$$

Not isosceles

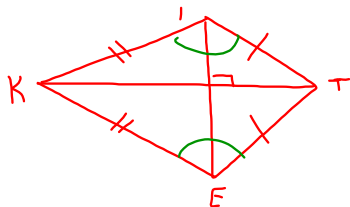


Isosceles trapezoid ACDF

$$m\angle 1 = 3x + 5$$

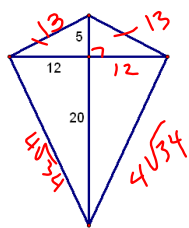
$$m\angle 3 = 6x - 5$$

Kite--a quadrilateral that has 2 pairs of consecutive congruent sides, but opposite sides are not congruent.



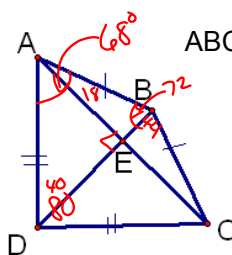
Theorem 8.18--If a quadrilateral is a kite, then its diagonals are perpendicular.

Theorem 8.19--If a quadrilateral is a kite, then exactly one pair of opposite angles are congruent.



Find the lengths of the sides of the kite.

$$C^2 = 12^2 + 20^2$$



ABCD is a kite.

$m\angle ADC = 80^\circ$   
 $m\angle ABC = 144^\circ$   
 Find the  $m\angle DAB = 68^\circ$   
 Find the  $m\angle BAC = 18^\circ$   
 Find the  $m\angle CAD = 50^\circ$

$$\begin{array}{r} 180 \\ -144 \\ \hline 36 \div 2 = 18 \end{array}$$

HW  
p546-548  
5,7-15, 18-22, 25-27,  
30, 32,39